Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

PUBLIC HEALTH REPORTS

VOL. 32 SEPTEMBER 7, 1917 No. 36

TETANUS IN COURT-PLASTER.

A report just received from the Director of the Hygienic Laboratory of the Public Health Service states that out of 13 specimens of court-plaster examined, 2 were found to be contaminated with tetanus bacilli. The specimens were secured from drug stores and were in original packages just as the product goes to the consumer. There is no ground for believing that the contamination was an intentional one. Whether contamination occurred during the process of manufacture through the use of infected ingredients, or subsequently by careless handling remains to be determined by further investigation.

It was also found that court-plaster is not "clean" in the surgical sense.

The report of the laboratory findings in the examination of the specimens of court-plaster appears elsewhere in this issue.

RODENT DESTRUCTION ON SHIPS.

A REPORT ON THE RELATIVE EFFICIENCY OF FUMIGANTS AS DETERMINED BY SUBSEQUENT INTENSIVE TRAPPING OVER A PERIOD OF ONE YEAR.

By R. H. Creel, Assistant Surgeon General, and Friench Simpson, Passed Assistant Surgeon, United States Public Health Service.

Much has been written of the effectiveness of various agents used in the fumigation of ships for the purpose of destroying rats, but thus far practically all definite data have been obtained from experimental studies performed under artificial conditions.

For many years arbitrary standards for the strength of sulphur dioxide as a fumigant have been provided in the United States quarantine regulations and the length of exposure has been likewise indicated. Although based on experimental investigation, the effectiveness of these standards has been supported to some extent by the general observations of quarantine officials. It has frequently been noted that a very large number of rats have been killed on ships as a result of sulphur fumigation, but regardless of the number destroyed it has always been a matter of speculation as to how many survived.

In more recent years tentative standards have been adopted for the cyanide fumigation of vessels, both as to strength of the gas and duration of exposure. It is repeated, however, that both the standards for sulphur dioxide and cyanide gas were based on experimental studies, and, as is well known, artificial conditions rarely coincide with the natural, however painstaking the attempt may be to simulate the natural. A true test of efficiency would be that applied to the procedure as carried out in routine practice. Generally speaking, an opportunity for such practical test has been wanting until recently.

During the past year the combination of conditions at New Orleans made such a test feasible. These favorable circumstances were, first, the fumigation of a large number of vessels at the port of New Orleans and at the Service quarantine station at the mouth of the Mississippi River; second, the availability of a large and experienced force of trappers at New Orleans. The Public Health Service, in carrying out plague eradicative and preventive measures in the city of New Orleans, has maintained an adequate force of trappers throughout the entire city, and during the past year or two those men trapping along the wharves and river front have been specially selected for their efficiency and reliability, and their work has had the very closest supervision. The pattern of trap generally employed (almost exclusively so) was the snap trap, and on the various vessels trapped the number used has varied from 20 to 140, according to the size of the vessel. The number of days trapped varied from one to ten, depending on the length of the vessel's stay in port.

Accordingly, therefore, it was planned to make careful record of the intensive trapping of all vessels subsequent to their fumigation, and in this way to obtain a fairly reliable estimate of the efficiency of the fumigation. Record was maintained of the results on 214 vessels, the inclusion of a greater number of vessels fumigated being precluded by inability of trapping on account of the departure of the vessel immediately after fumigation.

The results obtained are divided into groups, according to the nature of the fumigant employed, and the part of the vessel where the rats were either destroyed by the fumigation or were subseqnently trapped. The proportion of cyanide used was 5 ounces per 1,000 cubic feet of space with duration of exposure of 1¼ hours for holds and one-half hour for superstructures. Some 10 vessels fumigated with cyanide at the New Orleans quarantine station were not taken into consideration as they varied somewhat in the proportion of cyanide and duration of exposure from those fumigated at the city of New Orleans. Throwing out of consideration these 10 vessels, however, produced no material change in the estimate of efficiency of that gas. Sulphur when used was in the proportion of 3 pounds per 1,000 cubic feet of space, with duration of exposure of 6 hours for holds and superstructures alike.

Series 1.

VESSELS FUMIGATED EITHER WITH CYANIDE GAS OR SULPHUR DIOXIDE.

In this group the results of fumigation are considered in respect to the entire vessel, regardless of the condition of the ship (loaded or empty) or location from which rats were taken.

TABLE 1.

Nature of fumigant.	Number of vessels treated.	Number of rats killed by fumigant.	Number of rats trapped.	Percentage of efficiency of fumigant.
				Per cent.
Sulphur dioxide	62	747	223	77
Cyanide gas	182	2,811	121	95

Table 1 affords a fair estimate of the relative efficiency of cyanide gas and sulphur dioxide. It would appear that whereas cyanide fumigation of 182 vessels resulted in the destruction of 95 of each possible 100 rodent inhabitants, sulphur dioxide destroyed only 77 of a possible 100 in a series of 62 vessels treated with that fumigant, and this notwithstanding that the duration of exposure to sulphur fumes was 6 hours, in contrast to 1¼ hours or less when cyanide was used.

Series 2.

TABLE 2.

Nature of fumigant.	Number of vessels recorded.	Compartment of vessel considered.	Number of rats killed by fumigation.	Number of rats subsequently trapped.	Percentage of efficiency of fumigant.
Sulphur dioxide	32	Superstructure[1]	133	107	55
Cyanide gas	31	.....do.[1]	729	45	94
Sulphur dioxide	28	Holds (empty)	702	28	96
Cyanide gas	34	.....do	854	9	99
Sulphur dioxide	10	Holds (loaded)	104	59	64
Cyanide gas	10	.....do	80	20	80

[1] Superstructures include storerooms, crews' quarters, cabins, poop deck, etc.

Table 2 represents the efficiency of fumigation as applied to various compartments, such as superstructures and holds, both empty and loaded. The various groups recorded in Table 2 are those taken from Table 1 in all cases where rodents were reported with reference to compartment of ship as either destroyed by fumigation or captured by trapping. The groups in Table 2 do not represent partially fumigated vessels, since all vessels were fumigated throughout, excepting engine rooms of some vessels. The comparatively smaller number of vessels in Table 2 is due to the fact that during the first six months, reports included only total number of rats without reference to compartments from which taken, and also that on a considerable number of vessels negative results were reported both as to trapping and fumigation. The grouping was made from records where available and thus can not be considered as "selected cases."

The results obtained from the two methods of fumigation are contrasted and indicated in the table, and it will be noted that there is a very marked disparity in the efficiency of sulphur dioxide as compared with cyanide gas, in the treatment of superstructures. These compartments, such as store rooms, poop decks, crews' quarters, etc., are generally partially filled with supplies, stores, dunnage, etc., and it would appear that the greater effectiveness of cyanide gas is due to its greater penetrating powers, as well as toxicity. It may also be that sulphur dioxide, on account of its odor, may provide more of a warning to the rats and enable them to secure greater protection; whereas cyanide with less odor and without the physically irritating properties of sulphur dioxide, may result in the destruction of the animal before it can secure available covert.

In the fumigation of the empty holds of vessels there is no material difference in the results obtained, although here as elsewhere there should be considered the difference in the length of exposure. Considering the respective gases, the results on vessels fumigated with cargo-laden holds indicate a greater efficiency for cyanide gas, although the number of vessels tabulated is rather small for the establishment of any general conclusions. Conditions in storerooms, crews' quarters, poop decks, etc., are more or less similar to those of loaded holds, and on the basis of the results of the fumigation of these superstructures, it is believed that it can safely be asserted that cyanide gas is far more effective in the fumigation of loaded holds than is sulphur dioxide.

Rodent Infestation of Engine Fireroom.

The question frequently arises in the minds of quarantine officers as to the advisability or necessity of including the engine fireroom of a vessel when performing fumigation for rodent destruction. Inasmuch as there is very limited harborage in the engine fireroom, and very little in the way of food to invite rat infestation, it is generally considered that the fumigation of this compartment is of questionable value. Aside from this aspect of the case, the thorough fumigation of the engine fireroom entails a very considerable increase in the detention of vessels undergoing fumigation, since the fires have to be either drawn or banked, and the funnels carefully covered over with tarpaulin in order to prevent the escape of the fumigating gas. Subsequent to the fumigation of these compartments there is a further delay incident to renewing the fires or raising steam.

From the records maintained during the past year opportunity has presented for estimating the amount of rodent infestation of engine firerooms. In the case of 99 vessels fumigation of these compartments was omitted. The total number of rats killed in other parts of vessels by fumigation was 2,026. The trapping of these 99 vessels resulted in the capture of 31 rats in engine fireroom, the total being taken from 11 vessels. Computed on the total number of vessels considered it would appear that the rodent infestation of the engine fireroom compartment was one-third rat per vessel. Computed on the total infestation, the number infesting the engine fireroom compartment was 1½ per cent.

The number of days each vessel was trapped varied from 1 to 13, and the average number of days trapped for each vessel was 3.6 days. The number of traps placed on the vessels ranged from 15 to 140, according to the size of the vessel. The average number of traps placed was 37 traps to each vessel. On one vessel on which 172 rats were destroyed by fumigation, and on which the engine fireroom was not fumigated, three days' trapping of this compartment failed to demonstrate any rodent infestation. The same applies to two other vessels, on one of which 109 rats were taken and on the other 140 rats. On the other hand, of the 11 vessels on which rats were trapped in the engine fireroom, one ship yielded 8 rats captured in this compartment during the 13 days of trapping, although only 3 rats were killed in the other parts of the vessel. This was a very exceptional case, as in most instances where rats were trapped in nonfumigated engine fireroom compartments the number was generally one or two.

General Conditions.

The writers have considered two sources of error in presenting these figures: First, notwithstanding the thorough search of vessels, it is probable that a certain number of rats destroyed by fumigation were not recovered by the searchers, and to this extent, therefore, the percentage of efficiency would be greater than that indicated; second, while it is believed that the trapping results were fairly dependable, and for the most part represented (with the exception of a negligible figure) the total number of rats that escaped fumigation, it is nevertheless apparent that trapping results can not be considered as perfect, and to this extent the percentage of fumigation efficiency would be less than that indicated. After thorough consideration of both factors, knowledge of the dependability and efficiency of the trappers and fumigators, and the general conditions attending both the fumigation and trapping of vessels, the writers are of the belief that the one source of error will offset the other, and that the percentages of efficiency indicated in Table 1 and Table 2 are trustworthy.

It is apparent that sulphur fumigation is not effective for the destruction of rats on loaded vessels or in superstructures. Whether this deficiency can be remedied by an increase in the amount of sulphur used or in prolonging the exposure, or whether a change in the procedure would be justifiable in the face of results of cyanide fumigation, are problems requiring further consideration.

The effectiveness of cyanide gas when used according to the tentative standards now in practice seems sufficient for empty holds and superstructures. It would seem probable, however, that in vessels with cargo-laden holds either a greater strength of the gas is required or a more prolonged duration of exposure. It is not to be expected, however, that any method of fumigation can result in 100 per cent efficiency.

Judging from the results of our observations it would appear that the fumigation of engine and fire rooms can, under ordinary conditions, be omitted, without materially reducing the effectiveness of the destruction of rodents on vessels. The omission of the fumigation of these compartments on 99 vessels apparently resulted in the escape of 1½ per cent of the rodent inhabitants, but inasmuch as it seems probable that in ordinary practice the efficiency of fumigation can not be expected to exceed 96 per cent, the addition of 1½ per cent in effectiveness seems immaterial. In exceptional cases, such as demonstrable plague infection on board vessels, it is believed that the engine and fire rooms should be included in the procedure.

TETANUS IN COURT-PLASTER.

RESULTS OF THE BACTERIOLOGICAL EXAMINATION OF 14 SPECIMENS.

By G. W. McCoy, Director, Hygienic Laboratory, J. P. Leake, Passed Assistant Surgeon, and H. B. Corbitt, Sanitary Bacteriologist, United States Public Health Service.

So much has appeared in the public press about alleged intentional contaminations of court-plaster with tetanus, and so many inquiries have reached this laboratory on the same subject, that the following record of our experience with the examination of court-plaster is presented.

We have no evidence whatever that any specimen we examined was deliberately contaminated. Indeed, so far as our work goes, we do